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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/052,411	01/23/2002	Jong Han Lee	0630-1414P	3426

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EXAMINER	
BAYARD, EMMANUEL	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	02/12/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/12/2007.

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mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/052,411	LEE, JONG HAN	
	Examiner	Art Unit	
	Emmanuel Bayard	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3, 5-8, 9- 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3, 5-7 and9-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This is in response to amendments filed on 1/5/07 in which claims 1-3, 5-7 and 9-17 are pending. The applicant's amendments have been fully considered but they are moot base on the new ground of rejection therefore this case is made final.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raghavan et al U.S. Patent No 6,038,269 in view of Strolle et al U.S. Patent No 5,757,855.

As per claims 1, 7 and Raghavan et al teaches a Fixed-Delay Tree Search with Decision Feedback (FDTS/DF) equalizer comprising: a feed-forward filter receiving and filtering a sampled signal (see fig.3 element 100 and col.3, lines 44-45); a feed-back filter filtering a restored data (see fig.3 element 200 and col.3,lines 44-50); a subtractor obtaining a difference between signals respectively filtered by the feed- forward filter and the feed-back filter (see fig.3 element 300 and col.3, lines 44-50 and col.4, lines 1-10); and a detector means receiving the subtracted signal and detecting a data (see figs. 3-4, 8, 10, 12 elements 400, 702, 1000 and 1100 and col.4, lines 7-12) wherein the detector comprises: a plurality of branch metric calculating units obtaining an error between the subtracted signal and a reference signal (see element 401 and col.6, lines

15-34); an adder adding the values outputted from the plurality of branch metric calculating units (see element 403 and col.6, lines 35-44); a path metric memory storing the added value (see element 403 and col.6, lines 55-67); a minimum value calculating unit calculating a minimum value of the accumulated values (see fig.4 element 405 and col..6, lines 45-55); and a comparator comparing the minimum values and outputting a most minimum value (see col.6, lines 57-65 and col.7, lines 18-20).

However Raghavan et al does not teach a detector using an absolute value calculation .

Strolle et al teaches a detector using an absolute value calculation (see fig.4 elements 304, 310, 308 and col.10, lines 60-67).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Strolle et al into Raghavan as to calculate the magnitude of the difference between the received equalized input signal and a signal having values –2, 2, or zero as taught by Strolle et as (see col.11, lines 52-67).

As per claim 2, Raghavan et al teaches a wherein the feed-forward filter changes the sampled signal to a causal signal (see fig.3 element 100).

As per claim 3, Raghavan et al teaches wherein the feedback filter removes an intersymbol interference of the causal signal (see fig.3 element 200 and col.3, lines 33-35).

As per claims 5, 9, Raghavan et al teaches wherein the plurality of branch metric calculating means-units are sequentially delayed as deep as T from '0', respectively (see fig.3 elements 201 and col.3, lines 60-67).

As per claims 6, 10 Strolle et al teaches wherein the plurality of branch metric calculating units comprise: a plurality of absolute value calculating means--units obtaining an absolute value of the difference between the subtracted value and the reference signal (see fig.4 elements 304, 310, 308 and col.10, lines 60-67); and a multiplexer is functionality equivalent to the claimed (demultiplexer demultiplexing) the signal outputted from the absolute value calculating means units (see fig.4 element 314 or 322 and col.11, lines 1-10). Furthermore implementing such teaching into Raghavan et al would have been obvious to one skilled in the art as to produce a signal representing a first error metric as taught by Strolle et al (see col.11, lines 1-10).

As per claim 11, Raghavan et al teaches A data restoring method of a Fixed-Delay Tree Search with Decision Feedback (FDTS/DF) equalizer said method comprising: obtaining a difference (see fig.3 element 300 and col.3, lines 44-50 and col.4, lines 1-10) between signals respectively filtered by a feed-forward filter (see fig.3 element 100 and col.3, lines 44-45) and a feed-back filter(see fig.3 element 200 and col.3,lines 44-50); computing an error between the signal difference and a reference signal (see figs. 3-4, 8, 10, 12 elements 400, 702, 1000 and 1100 and col.4, lines 7-12); delaying the error as deep as x and adding them (see fig.3 elements 201 and 63 and col.3, lines 60-67); storing the added results (see element 403 and col.6, lines 55-67); and obtaining a minimum value of the stored error values and obtaining a path according to the minimum value (see fig.4 element 405 and col..6, lines 45-55).

However Raghavan et al does not teach computing an error through an absolute value calculation.

Strolle et al teaches a detector computing an error through an absolute value calculation (see fig.4 elements 304, 310, 308 and col.10, lines 60-67).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Strolle et al into Raghavan as to calculate the magnitude of the difference between the received equalized input signal and a signal having values –2, 2, or zero as taught by Strolle et as (see col.11, lines 52-67).

As per claim 12 Raghavan and Strolle in combination would teach wherein, in the path obtaining step, only the branch metric containing a selected path is left while remaining branch metrics are discarded as to accurately improve the SNR of the signal from intersymbol interference.

As per claim 13, Raghavan et al teaches a Fixed-Delay Tree Search with Decision Feedback (FDTS/DF) equalizer comprising: a feed-forward filter receiving and filtering a sampled signal (see fig.3 element 100 and col.3, lines 44-45); a feed-back filter filtering a restored data (see fig.3 element 200 and col.3,lines 44-50); a subtractor disposed between the feed-forward and feed-back filters and obtaining a difference between signals respectively filtered by the feed-forward filter and the feed-back filter (see fig.3 element 300 and col.3, lines 44-50 and col.4, lines 1-10).

However Raghavan et all does not teach a plurality of absolute value calculating units disposed after the subtractor and obtaining an absolute value of the difference between the subtracted value and a reference signal; and a demultiplexer demultiplexing the signal outputted from the absolute value calculating units.

Strolle et al teaches a plurality of absolute value calculating units disposed after the subtractor and obtaining an absolute value of the difference between the subtracted value and a reference signal (see fig.4 elements 304, 310, 308 and col.10, lines 60-67); and a multiplexer is functionality equivalent to the claimed (demultiplexer demultiplexing) the signal outputted from the absolute value calculating means units (see fig.4 element 314 or 322 and col.11, lines 1-10).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Strolle et al into Raghavan as to calculate the magnitude of the difference between the received equalized input signal and a signal having values –2, 2, or zero as taught by Strolle et as (see col.11, lines 52-67).

As per claim 14, Raghavan et al teaches an adder adding (see fig.4 element 402) the values outputted from the demultiplexer; a path metric memory storing the added value (see element 403 and col.6, lines 55-67); a minimum value calculating unit calculating a minimum value of the accumulated values (see fig.4 element 405 and col..6, lines 45-55); and a comparator comparing the minimum values and outputting the most minimum value (see col.6, lines 57-65 and col.7, lines 18-20).

As per claim 15, Raghavan et al teaches wherein the feed-forward filter changes the sampled signal to a causal signal (see fig.3 element 100).

As per claim 16, Raghavan et al teaches wherein the feedback filter removes an intersymbol interference of the causal signal (see fig.3 element 200).

As per claim 17, Raghavan et al teaches wherein the plurality of absolute value calculating units are sequentially delayed as deep as x from '0', respectively (see fig.3 element 201).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Choi U.S. Patent No 6,201,832 B1 teaches synchronous data.

Zortea et al U.S. Patent No 6,760,372 B1 teaches an adaptive signal.

Krishanamoorthy et al U.S. Patent No 6,356,586 B1 teaches a methods and apparatus for parallel DFE.

Nakata et al U.S. Patent No 6,798832 B1 teaches a semiconductor device.

Chu et al U.S.Pub No 20020094043 A1 teaches apparatus and method and system for correlated noise.

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571 272 2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Emmanuel Bayard
Primary Examiner
Art Unit 2611

2/5/07

EMMANUEL BAYARD
PRIMARY EXAMINER